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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/901,566	07/11/2001	Keita Ito	010698	4812
23850	7590	12/11/2003	EXAMINER	
ARMSTRONG, KRATZ, QUINTOS, HANSON & BROOKS, LLP 1725 K STREET, NW SUITE 1000 WASHINGTON, DC 20006			LUGO, CARLOS	
			ART UNIT	PAPER NUMBER
			3677	

DATE MAILED: 12/11/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/901,566

Applicant(s)

ITO ET AL.

Examiner

Carlos Lugo

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 September 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 November 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☒ Other: *Translation of DE 3,841,203.*

DETAILED ACTION

1. This Office Action is in response to applicant's amendment filed on September 22, 2003.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. **Claim 1 is rejected** under 35 U.S.C. 103(a) as being unpatentable over DE Pat No 3,841,203 to Obermayer et al (Obermayer) in view of US Pat No 5,263,444 to Prior et al (Prior).

Obermayer discloses a seal structure comprising a crankcase (1) having a crank chamber. The crankcase is coupled to a lower face of a cylindrical block (4). The crankcase includes first and second case halves (1' and 1'') coupled to each other in a plane perpendicular to the joint surfaces between the crankcase and the cylindrical block.

One of the case halves includes a U shaped groove (5) that extends along a peripheral edge of the chamber (Page 2 Lines 5-9, where at least one member includes the groove).

Enlarged recesses (where 12 is located) are provided only in the first and second case halves and extend laterally from opposite ends of the seal groove.

A bar shaped seal member (6) is mounted in the groove. A gasket (17) is located between the joint surfaces of the block and the crankcase that comes in close contact with the enlarged end portions of the bar seal member.

A T-shaped intersecting joint are among the cylindrical head and the first and second case halves is sealed by the seal member and the gasket

However, Obermayer fails to disclose that at the opposing ends of the bar shaped seal has an enlarged end to be entirely filled on the enlarged recess. Obermayer disclose that a seal ring (10) that is attached to the opposite ends of the bar seal member and placed on the enlarged recess (with the help of the spring member 15).

Prior teaches a seal structure (30) located on a groove (28) between crankcases members (10 and 12) comprising a bar shaped seal member (32) having enlarged opposite ends (36) that is received on enlarged recess (18). Between the enlarged end portion of the seal and the joint surfaces is placed a gasket (24).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have a seal arrangement, as taught by Prior, into a seal structure as described by Obermayer, in order to permit accurate location of the seal member in the engine body and to provide a seal structure that will be easy to install.

Response to Arguments

4. Applicant's arguments, see Amendment, Pages 4 and 5, filed on September 22, 2003, with respect to the rejection(s) of claim(s) 1 under 35 U.S.C. 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn.

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However, upon further consideration, a new ground(s) of rejection is made in view of newly found prior art reference.

Conclusion


5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Carlos Lugo whose telephone number is 703-305-9747. The examiner can normally be reached on 9-6pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Judy Swann can be reached on 703-306-4115. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-306-5771.

December 3, 2003.

Carlos Lugo
Examiner
Art Unit 3677



WILLIAM L. MILLER
PRIMARY EXAMINER

P04-660

German Patent No. 38 41 203 A1
Offenlegungsschrift

TWO-STROKE ENGINE WITH DIVIDED HOUSING

Robert Obermayer and Wolfgang Emmerich

UNITED STATES PATENT AND TRADEMARK OFFICE
WASHINGTON, D.C. NOVEMBER 2003
TRANSLATED BY THE RALPH MCELROY TRANSLATION COMPANY

FEDERAL REPUBLIC OF GERMANY
GERMAN PATENT AND TRADEMARK OFFICE
PATENT NO. 38 41 203 A1

Int. Cl. ⁵ :	F 02 F 7/00 F02 F 11/00
Filing No:	P 38 41 203.9
Filing Date:	December 7, 1988
Date Laid-open to public inspection:	June 13, 1990

TWO-STROKE ENGINE WITH DIVIDED HOUSING

[Zweitaktmotor mit geteiltem Gehäuse]

Inventors:	Robert Obermayer Wolfgang Emmerich
Applicant:	Solo Kleinmotoren GmbH
Publications to be considered for the evaluation of patentability:	DE PS 2 74 890 DE GM 19 93 272 JP 62 135647 A in: Patent Abstracts of Japan, M-644, November 20, 1987, vol. 11, No. 356; - JP 57 119144 A in: Patent Abstracts of Japan, M-167, October 26, 1982, vol. 6, No. 213

* * *

Specification

The invention relates to a two-stroke engine with a two-part plastic crankcase in which a crankshaft is supported in two main bearings and with an aluminum cylinder screwed to the two-part crankcase.

When the two-part crankcase is sealed in such a two-stroke engine, sealing problems occur, so that air drawn in at the connecting joints alters the air-fuel ratio, thus causing uneven

operation. The warping which occurs in plastic parts results in leaks when a flat seal with a conventional shape is used for sealing.

In order to avoid the described disadvantages the present invention has the basic problem of designing a two-stroke engine of the initially cited type to be as airtight as possible.

In order to solve this problem the invention provides that a rubber elastic toroidal sealing ring is arranged in the separating joint of the two crankcase parts of the two-part plastic crankcase, that this toroidal sealing ring is held in a receiving groove of at least one of the flanges of the two crankcase parts of the two-part crankcase in a positive manner, and that a gasket with a closed circumference is provided between the two-part crankcase and the cylinder.

In an especially advantageous manner ends of the toroidal sealing ring can cooperate with the gasket, to which end the gasket comprises two receptacles for the ends of the toroidal sealing ring. This can achieve a reliable seal of the especially problematic seal transitions at the junction of two sealing planes running vertically to one another. To this end the receptacle that receives the end of the toroidal sealing ring can comprise a perforation adapted in its diameter in a space-saving manner, whose axis runs vertically to the sealing plane of the toroidal sealing ring.

In a further development of the invention the receptacle can be designed in a cup shape with the perforation provided in the bottom of this cup-shaped receptacle. In addition, a spring can be received in the cup-shaped receptacle by means of which the bottom of the cup-shaped receptacle is pressed against a sealing shoulder of the two-part crankcase.

In order to reduce the thermal load on the plastic parts and seals, it can be especially advantageous to provide an insulating plate in the shape of a flat ring and with a high resistivity to heat between the gasket and the cylinder. It is also purposeful if the receptacle is shielded from the cylinder by the insulating plate in the shape of a flat ring.

The insulating plate can be penetrated by the ends of the toroidal sealing ring in a manner which saves space and construction weight, each of which ends can then extend into a recess of the cylinder in order to be able to compensate tolerances of length without problems.

The receptacle can be connected in an especially advantageous and one-piece manner to the gasket by an intermediate sealing piece, which intermediate sealing piece covers the separating joint between the two crankcase parts, so that a seamless seal of all separating joints from the interior of the crankcase is assured.

Other embodiments of the invention can be gathered from the subclaims and are explained in detail with their advantages in the following description with reference made to the attached drawings.

Figure 1 shows a section through a two-stroke engine through the separating joint of the two-part crankcase.

Figure 2 shows a partial section along line II-II in Figure 1.

Figure 3 shows a view of the cylinder with inserted gasket from the crankshaft.

Figure 4 shows an enlarged section of area IV in Figure 1.

Figure 5 shows a partial top view of the area shown in Figure 4 on a gasket.

Figure 6 shows a partially exploded view of the sealing area shown in Figure 4 without cylinder and crankcase.

In the exemplary embodiment shown in the attached figures the two-stroke engine comprises crankcase 1 composed of two crankcase parts 1', 1" in which crankcase 1 crankshaft 3 is supported in two roller bearings 2. Aluminum cylinder 4 is set on crankshaft housing 1.

In order to seal the separating joint between the two crankcase parts 1', 1", toroidal sealing ring consisting of rubber elastic material is inserted into receiving groove 5. The ends of this toroidal sealing ring 6 extend into recesses 7 of cylinder 4.

Crankshaft parts 1', 1" are fixed to and centered relative to one another by pins (not shown) and adapted recesses 8 and flanged to one another by screws (also not shown).

The outer ring of roller bearing 2 is secured against entrainment by rubber elastic pin 9.

Gasket 10 that is closed in its circumference is provided between cylinder 4 and crankcase 1 in a positive manner and is connected in a one-piece manner on two opposite sides by intermediate sealing pieces 11 to cup-like recesses 12. Bottom 13 of cup-like recesses 12 is provided with perforation 14 through which an end of toroidal sealing ring 6 extends, as Figure 4 shows. Toroidal sealing ring 6 is provided in recess 12 and surrounds a spring at a distance, which spring presses bottom 13 against sealing shoulder 16 of crankcase 1. This sealing shoulder 16 is located symmetrically in the sealing joint of crankcase parts 1', 1", which joint is sealed against bottom 13 an intermediate sealing piece 11.

Insulating plate 17 with a high resistivity to heat is provided between gasket 10 and cylinder 4 for protection against heat and also covers receptacles 12. The ends of toroidal sealing ring 6 extend through insulating plate 17.

Claims

1. A two-stroke engine with a two-part plastic crankcase (1) in which a crankshaft (3) is supported in two main bearings (roller bearings 2) and with an aluminum cylinder (4) screwed to the two-part crankcase (1), characterized in that a rubber elastic toroidal sealing ring (6) is arranged in the separating joint of the two crankcase parts (1', 1") of the two-part plastic crankcase (1), that this toroidal sealing ring (6) is held in a receiving groove (5) of at least one of the flanges of the two crankcase parts (1', 1") of the two-part crankcase (1) in a positive manner, and that a gasket (10) with a closed circumference is provided between the two-part crankcase (1) and the cylinder (4).

2. The two-stroke engine according to Claim 1, characterized in that the ends of the toroidal sealing ring (6) cooperate with the gasket (10), to which end the gasket (10) comprises two receptacles (12) for the ends of the toroidal sealing ring (6).

3. The two-stroke engine according to Claim 2, characterized in that the receptacle (12) that receives the end of the toroidal sealing ring (6) comprises a perforation (14) adapted in its diameter, whose axis preferably runs vertically to the sealing plane of the toroidal sealing ring (6).

4. The two-stroke engine according to Claim 2 or 3, characterized in that the receptacle (12) is designed in a cup shape, that the perforation (14) is provided in the bottom (13) of this cup-shaped receptacle (12) and that, in addition, a spring (15) is received in the cup-shaped receptacle (12) by means of which the bottom (13) of the cup-shaped receptacle (12) is pressed against a sealing shoulder (16) of the two-part crankcase (1).

5. The two-stroke engine according to one of Claims 1 to 4, characterized in that an insulating plate (17) with a high resistivity to heat is provided between the gasket (10) and the cylinder (4).

6. The two-stroke engine according to Claim 4 or 5, characterized in that even the receivers (12) are shielded against the cylinder (4) by the insulating plate (17).

7. The two-stroke engine according to Claim 6, characterized in that the insulating plate (17) can be penetrated by the ends of the toroidal sealing ring (6) and that each of these ends extends into a recess (7) of the cylinder (4).

8. The two-stroke engine according to one of Claims 3 to 7, characterized in that the receptacle (12) is connected to the gasket (10) by an intermediate sealing piece (11) and that this intermediate sealing piece (12) covers the separating joint between the two crankcase parts (1', 1'').

9. The two-stroke engine according to one of Claims 1 to 8, characterized in that the crankcase parts (1', 1'') are positively centered by alignment pins and adapted pin receptacles (recesses 8).

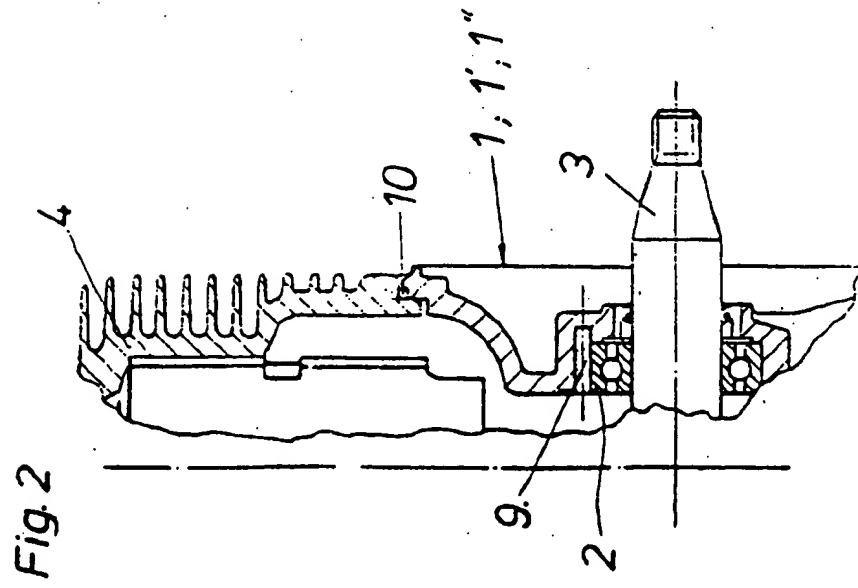
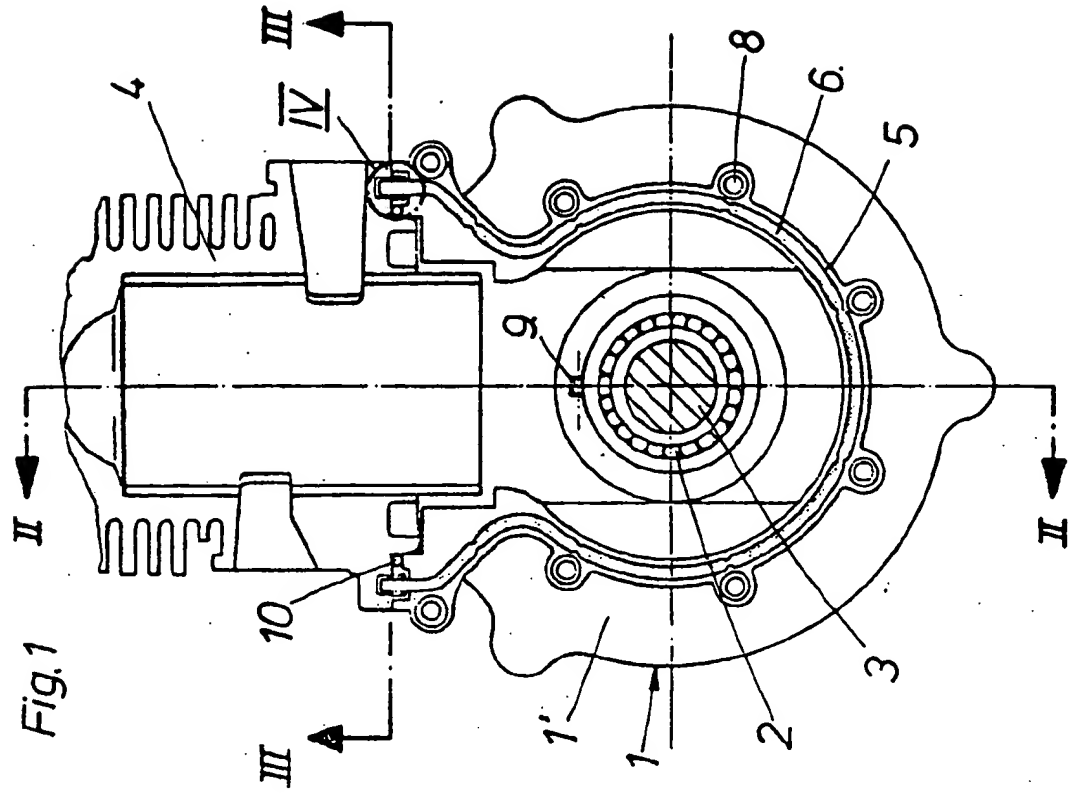
10. The two-stroke engine according to Claim 9, characterized in that fastening screws run coaxially through the alignment pins.

11. The two-stroke engine according to Claims 9 and 10, characterized in that the fastening screws are screwed into the bottom of the pin receptacles (recesses 8), preferably by injected nut parts.

12. The two-stroke engine according to one of Claims 1 to 11, characterized in that the outer rings of the roller bearings (2) are prevented from being entrained by the rubber elastic pins (9).

13. The two-stroke engine according to one of Claims 1 to 12, characterized in that the seal of the cylinder (4) against the crankshaft housing (1) preferably takes place radially on two diameters with different sizes.

2 page(s) of drawings



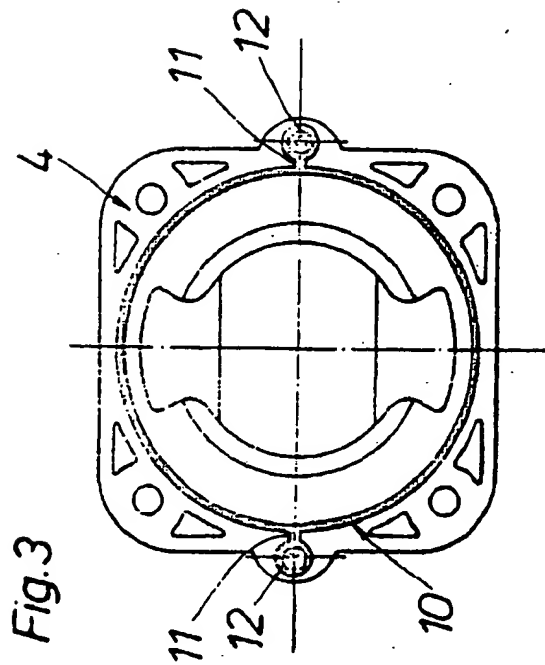


Fig. 3

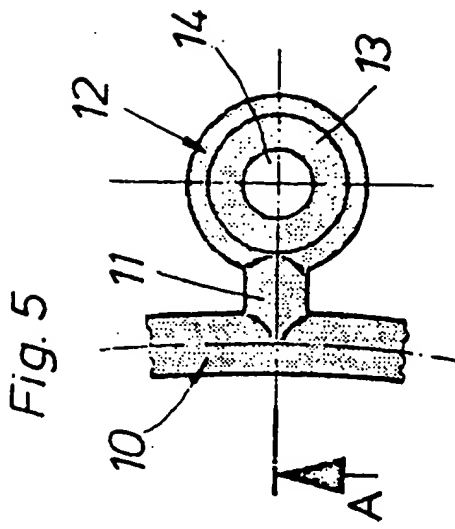


Fig. 5

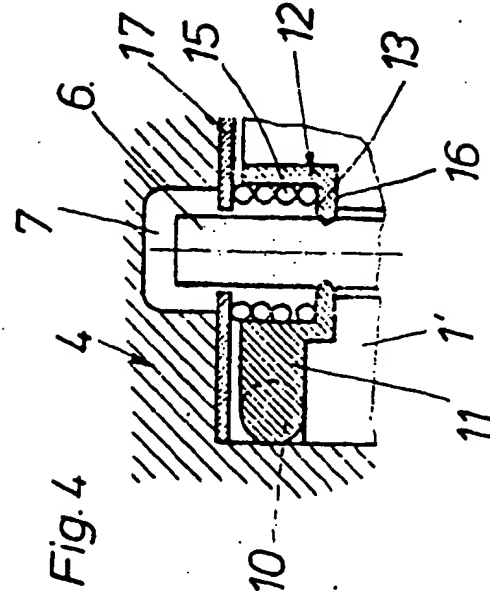


Fig. 4

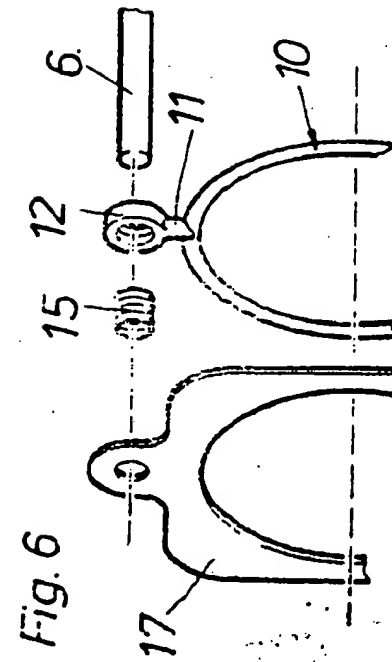


Fig. 6